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# **Symptom Awareness Measures for Breast and Cervical Cancer in Sub-Saharan Africa: A Scoping Review**

**Tweet for journal Twitter profile:** A scoping review of symptom awareness measures for breast and cervical cancer in Sub-Saharan Africa

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**Authors' contributions**

JM, FMW, SES and ADM initiated the study and developed the study protocol. JNG conducted the literature search, drafted the manuscript, incorporated revisions and prepared the final draft. JM, FMW and SES reviewed the articles for eligibility. All the authors reviewed drafts and approved the manuscript.

**Disclaimer**

The views expressed in the submitted article are those of the authors and not the official position of any of the funders or institutions represented.

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**Summary**

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**Background:** In Sub-Saharan Africa (SSA) breast cancer is the most commonly diagnosed cancer among women, whilst cervical cancer remains the leading cause of cancer death. Women often fail to recognise or misinterpret possible symptoms, so breast and cervical cancer symptom awareness information can promote timely help-seeking behaviour, diagnosis and start of treatment.

**Aim:** To identify tools which have been utilised to measure breast and cervical cancer symptom awareness in SSA.

**Methods:** A scoping review of articles published between January 1997 and February 2017, written in English, and describing primary research in breast and/or cervical cancer symptom awareness-related topics in SSA contexts, was undertaken across five databases. The approach was supported by Colquhoun *et al*'s methodological framework for scoping reviews.

**Results:** 41 studies were included from 11 SSA countries. Almost half (20/41) used breast and/or cervical cancer symptom awareness tools but did not report on tool validation processes. The rest (21/41) made reference to some tool validation, yet only two reported a detailed account of their tool validation processes. One explored lay perceptions of breast cancer, while the other sought to establish the validity and reliability of a UK tool in a Kenyan context.

**Conclusion:** The findings point to the dearth of comprehensively validated and culturally relevant tools to measure breast and cervical cancer symptom awareness in the SSA context. They have informed the development and validation of an African Women Awareness of CANcer [AWACAN] tool, which can support development and evaluation of interventions relevant to the SSA context.

## Introduction

Breast and cervical cancer are the leading cause of cancer morbidity and mortality in women. In Sub-Saharan Africa (SSA) breast cancer is the most commonly diagnosed cancer among women, whilst cervical cancer remains the leading cause of cancer death.<sup>1</sup> Yet, if diagnosed early, both cancers are treatable with curative intent. Worldwide, most cancers (85-90%) are diagnosed following symptomatic presentation.<sup>2</sup> Consequently, understanding processes related to cancer symptom epidemiology, symptom awareness and responses to symptoms are important in developing interventions to promote timely cancer diagnosis. For both breast and cervical cancer, women often fail to recognise or misinterpret these symptoms or wait until symptoms (and disease) progress before they seek medical attention.<sup>3,4</sup> For example, patients in Nepal have been shown to be more likely to recognise vaginal bleeding and seek care for symptoms, in contrast to recognising foul smelling vaginal discharge.<sup>5</sup> For breast cancer, women are more likely to recognise and seek care for breast lumps in contrast to non-lump symptoms.<sup>6</sup> There is evidence that interventions to increase awareness lead to better outcomes.<sup>7</sup> For instance, a Malaysian study reported earlier help-seeking for breast and cervical cancers following an intervention targeted at raising public awareness of symptoms

of these cancers.<sup>8</sup> This suggests that breast and cervical cancer symptom awareness and interpretation can promote timely help-seeking behaviour, diagnosis and start of treatment.

Accurate measurement of cancer symptom awareness, knowledge and beliefs using validated tools would enable precise measurement of the impact of cancer awareness interventions. Against this background, we conducted a scoping review to identify tools which have been utilised to measure breast and cervical cancer symptom awareness in SSA and evidence of their validity. Scoping reviews differ from systematic reviews in scope, criteria and quality assessment.<sup>9-11</sup> Scoping reviews cover a broader scope than systematic reviews which have a more clearly defined, narrow scope. This renders scoping reviews useful when attempting to encapsulate and disseminate findings from a diverse body of knowledge. Inclusion and exclusion criteria in a scoping study are developed during study selection unlike in a systematic review where such criteria are pre-determined prior to study selection, during protocol development. Scoping reviews present evidence based on key themes but do not delve in assessment of the quality of such evidence, as is the case in systematic reviews. Scoping reviews may be conducted as a preamble - to determine if it is necessary to conduct a full systematic review – or as an autonomous exercise, as we did in this review.

## **Methods**

The review was guided by two questions: (1) Which tools have been used to measure symptom awareness in SSA? (2) Have these tools been validated in any SSA populations? Following Colquhoun, et al.,<sup>12</sup> the review process incorporated the first five stages of Arksey and O'Malley's six-stage framework for conducting scoping reviews<sup>9</sup> with Levac, et al. enhancements of each stage.<sup>10</sup> The five stages are: stage 1: identifying the research question, purpose and objectives of the scoping study; stages 2-4: identifying relevant studies, study selection and charting the data respectively, and; stage 5: collating, summarising and reporting the results.

Identification of relevant studies commenced with a basic search for the terms breast cancer, cervical cancer, awareness, beliefs, measures, Africa on Web of Science, Scopus & Ebscohost electronic databases. We then sifted through key studies for potential broader search terms, which generated a list of terms (see Appendix 1). A scoping review of literature was then undertaken in PubMed, Web of Science, Ebscohost, Scopus and Cochrane

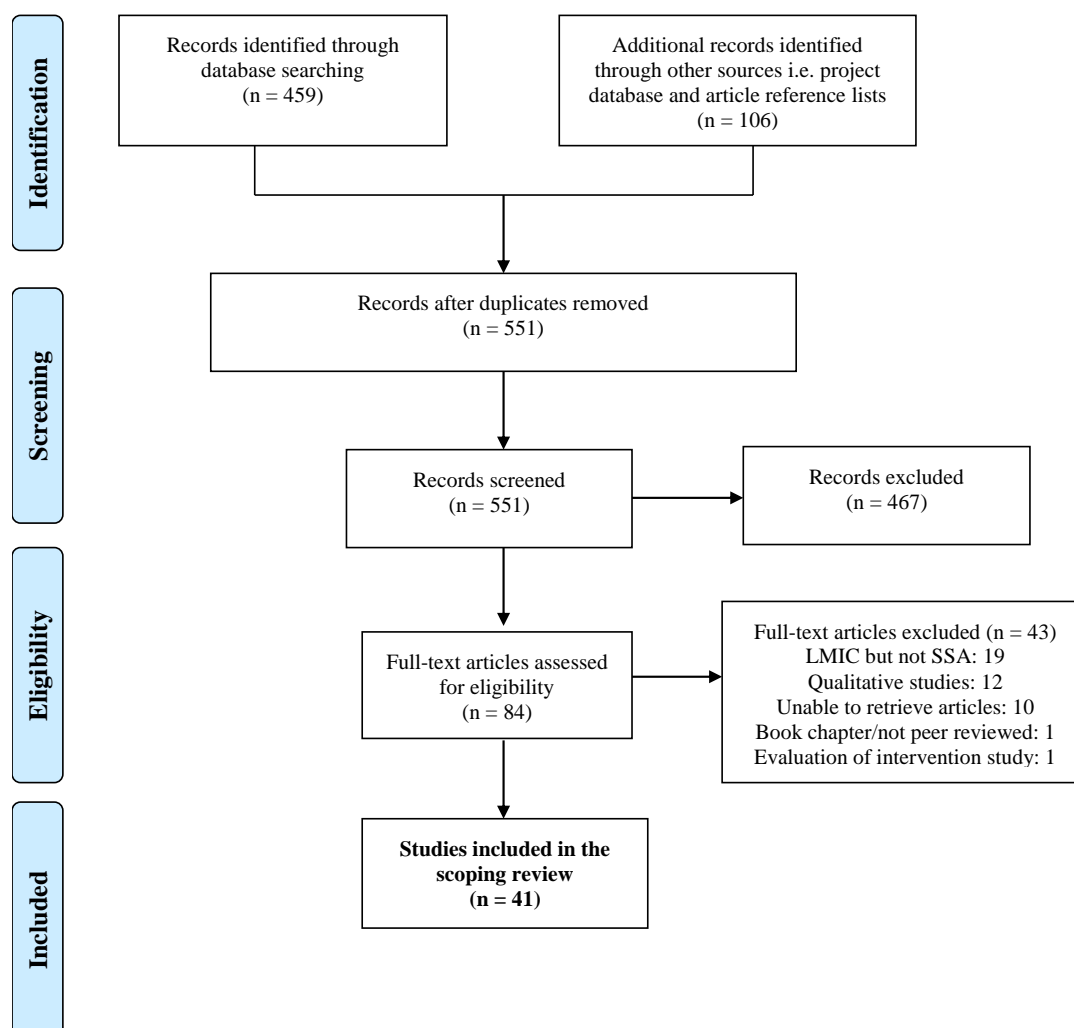
databases. This process entailed refining the search strategy with the aim of generating as many relevant articles as possible. The final search strings contained the terms ‘breast; cervix\*; cancer; neoplasm; symptom\*; sign; knowledge; perception\*; appraisal; understand\*; beliefs; attitudes; behavior; tool; scale; measure\*]’ in various combinations, with the Boolean phrases AND/OR. The database search was supplemented by articles identified by searching through reference lists of key articles.

We included peer reviewed journal articles published between January 1997 – February 2017, written in English and describing primary research in breast and/or cervical cancer symptom awareness-related topics in SSA contexts. Given the focus on tool validation which involves evaluating ‘*if the measurement tool employed actually measures the intended research concept or construct...or if the measurement tools used to quantify the variables provide stable or consistent responses*’,<sup>13</sup> that is, validity and reliability respectively, the research team limited articles to quantitative research studies. The exclusion criteria were: articles in languages other than English, non-peer reviewed articles and book chapters, grey literature, qualitative studies and studies from low-and-middle-income countries outside SSA. Selection of studies involved consultations among the authors who met as a team to establish consensus.

## **Results**

The PRISMA Flow Diagram and checklist<sup>14</sup> demonstrates our search strategy and included studies.

**FIGURE 1: PRISMA Flow Diagram**



Forty-one studies were included. In these studies, cancer awareness is discussed from various perspectives including: symptom knowledge, awareness, perceptions and attitudes about breast cancer, cervical cancer or cancer in general, including risk factors. The studies also discussed healthcare use including delays in seeking treatment, pathways to treatment and screening practices. SSA countries featured in this review are Botswana,<sup>43</sup> Cameroon,<sup>29</sup> Democratic Republic of Congo,<sup>19</sup> Ghana,<sup>3</sup> Kenya,<sup>20,23,26,52,53</sup> Nigeria,<sup>21,22,24,28,36,38,39,41,47,49</sup> Sierra Leone,<sup>40</sup> South Africa,<sup>18,27,32,46,48,50</sup> Tanzania,<sup>25,30,31,42</sup> Uganda,<sup>15,16,37,45,51</sup> and Zimbabwe.<sup>44</sup>

### ***Tools and Validation Processes***

Twenty of the 41 studies used symptom awareness tools but gave no detail on tool validation processes<sup>3-4, 15-32</sup> (see Table 1, Appendix 2). Twenty-one studies referred to some tool validation processes. Of these 19 had limited detail of validation (see Table 2),<sup>33-51</sup> and two documented thorough validation processes (see Table 3).<sup>52-53</sup> Regarding the 19 studies that made some limited reference to validation, two studies noted that they used validated tools but did not test the validity of the tools for themselves.<sup>33,34</sup> Three studies tested for internal reliability<sup>35-37</sup>; two of which also assessed test-retest reliability with 20 women,<sup>35a,b</sup> or an unspecified group of women with similar characteristics to the study sample.<sup>36</sup> 14 studies utilised pilot testing<sup>38-51</sup> as follows: two studies documented that they pilot tested their tools but gave no further information<sup>38,39</sup>; one study specified that they used pilot testing to test reliability of their tool<sup>40</sup>; one study alluded to their pilot test serving as a reliability (stability) test by identifying their participants as a separate group from that in the actual study<sup>41</sup>; six studies tested content validity using pilot tests followed by modification of items based on outcomes of the pilot tests<sup>42-47</sup>; Four studies utilised piloting for a combination of validity and reliability tests<sup>48-51</sup>. For instance, use of peer review<sup>48</sup> and expert review<sup>49</sup> to test for content validity, or testing construct validity by structuring content in line with relevant subject literature.<sup>48</sup> One study provided additional information on the number of items discarded and those retained after piloting, with content categories for the latter.<sup>49</sup>



**Table 2: Symptom awareness tools identified; some validation details provided**

Study	Country	Focus	Design	Tool(s)	Evidence of validity
Omotara, B., & Yahya, S. (2012) <sup>33</sup>	Nigeria	BC awareness, attitudes and practice	Cross-sectional descriptive community-based study	Interviewer administered structured validated questionnaire (23 items)	States validated questionnaire, but no further information provided
Hyacinth et al (2012) <sup>34</sup>	Nigeria	CC & Pap smear awareness & utilisation	Cross-sectional survey	Validated questionnaire	Referenced an unpublished thesis and one other study which pre-tested the questionnaire with participants (n=20) before the final questionnaire was developed
a) Oluwatosin, O.A. (2006) <sup>35a</sup> ; b) Oluwatosin, O.A. & Oladepo, O. (2006) <sup>35b</sup>	Nigeria	a) Rural women's perceptions of BC & its early detection measures b) Rural women's perceptions of BC & its early detection measures	Cross-sectional survey	Structured questionnaire with 4 questions & 56 items	Literature, focus groups to refine, test / re-test reliability = 0.95; One article specified 20 women participated in test/re-test reliability
Oluwatosin, O.A. (2010) <sup>36</sup>	Nigeria	BC: Assessment of risk factors & predictive factors for breast examination	Cross-sectional survey	Self-developed 3-part semi-structured questionnaire; one section used a validated tool [Gail Model]; questionnaire tested for reliability	Test/re-test reliability score = 0.95; tested with group of women with similar characteristics to study sample
Twinomujuni, C., Nuwaha, F., & Babirye, J.N. (2015) <sup>37</sup>	Uganda	Understanding the low level of CC screening	Cross-sectional community survey	Semi-structured interviewer administered questionnaire	Developed from previously published studies & validated tools (articles referenced); estimated Cronbach's internal reliability = 0.75
Akhigbe & Omuemo (2009) <sup>38</sup>	Nigeria	Knowledge, attitudes & practice of BC screening	Cross-sectional descriptive survey	Pre-tested self-administered questionnaire	Pre-test; no further details given on pre-test process & function of the same
Kayode, F.O., Akande, T.M., & Osagbemi, G.K. (2005) <sup>39</sup>	Nigeria	Knowledge, attitude & practice of breast self-examination	Descriptive cross-sectional survey	Pre-tested Structured questionnaire	Pre-tested; no further details given on the pre-test process and function of the same
Shepherd, J., & McInerney, P. (2006) <sup>40</sup>	Sierra Leone	BC knowledge	Quantitative descriptive-exploratory design	Questionnaire	Pilot study to test reliability (n=5); no results provided
Obaji, N.C. et al (2013) <sup>41</sup>	Nigeria	Awareness & practice of breast self-examination	Cross-sectional descriptive study	Interviewer administered questionnaire	Validated and pre-tested with a separate sample of women
Lyimo, F.S. & Beran, T.N. (2012) <sup>42</sup>	Tanzania	CC Screening: Demographic, knowledge, attitudinal, & accessibility factors	Cross-sectional survey	Structured questionnaire	Pilot testing in similar context, identification & modification of problematic questions
Mingo, A.M. (2012) <sup>43</sup>	Botswana	CC: Awareness & Screening	Hospital-based survey	Questionnaire	Content validity [n=3] & revised questionnaire accordingly
Mupepi, S.C. et al (2011) <sup>44</sup>	Zimbabwe	Knowledge, attitudes and demographic factors influencing CC screening behaviour	Cross-sectional community survey	Questionnaire	6 focus groups of 8 participants each [n=48] to test content and construct validity
Kiguli-Malwadde et al (2010) <sup>45</sup>	Uganda	Knowledge, attitude & practice of women on BC & mammography	Cross-sectional descriptive survey	Interviewer-administered questionnaire	Content validity - questionnaire reviewed for information quality and legitimacy & relevant corrections made
Mugivhi, N.H., Maree, J.E. & Wright, S.C.D. (2009) <sup>46</sup>	South Africa	Rural women's knowledge of prevention & care related to BC	Quantitative survey	Structured interview	Pre-tested for validity & reliability [n=10] & relevant modifications made to questionnaire
Salaudeen, A.G., Akande, T.M., & Musa, O.I. (2009) <sup>47</sup>	Nigeria	Knowledge & attitudes towards BC & breast self-examination	Cross-sectional descriptive survey	Self-administered questionnaire	Pre-tested [n=30] & revisions made accordingly
Ramathuba, Ratshirumbi, Mashamba, T. M. (2015) <sup>48</sup>	South Africa	BC knowledge, attitudes & screening practices	Quantitative descriptive cross-sectional design	Close-ended questionnaire pretested for validity and consistency	Content (literature & peer review) & construct validity; pre-test reliability [n=15]
Okobia, M.N. et al (2006) <sup>49</sup>	Nigeria	BC: Knowledge, attitude and practice	Cross-sectional community survey	Interviewer administered questionnaire	Content validity (literature & expert review) pre-tested for reliability [n=25] & ambiguous questions discarded
Francis, S.A. et al (2010) <sup>50</sup>	South Africa	Attitudes & knowledge about HPV & CC risk	Brief survey	Questionnaire	Developed based on literature review (articles referenced), pilot-tested & revised with a clinic-based population similar to the clinic sample
Mwaka, A.D. et al. (2015) <sup>51</sup>	Uganda	Community awareness of CC risk factors and symptoms	Cross-sectional population-based survey	Structured questionnaire	Developed based on literature review (articles referenced) & pilot test

Table 3 shows the two articles which gave a detailed account of their validation processes<sup>52,53</sup>. Both articles reported a study conducted by a research team from the Academic Model Providing Access to Healthcare [AMPATH] Oncology Institute, based in Eldoret, Kenya. One explored lay perceptions of breast cancer<sup>52</sup>, while the other sought to establish the validity and reliability of the UK Breast Cancer Awareness Measure (BCAM)<sup>55</sup> in a Kenyan context.<sup>53</sup>

**Table 3: Symptom awareness tools identified; thorough validation**

Study	Country	Focus	Design	Tool(s)
Naanyu, V., et al., (2015) <sup>52</sup>	Kenya	Lay perceptions of BC in Western Kenya	Cross-sectional survey	BCAM adapted: opinions about causes, symptoms, severity and treatment of BC captured as free-text responses to open-ended questions added to the BCAM tool.
Wachira, J., et al., (2017) <sup>53</sup>	Kenya	Psychometric assessment of BCAM for assessment of BC knowledge and barriers to screening in Kenya	Cross-sectional survey	BCAM: Assessment of face and psychometric validity of BCAM using cognitive testing (and adaptation of some items), factor analysis of survey data and correlations

Naanyu, et al.,<sup>52</sup> modified BCAM items by adding open-format questions relating to symptoms, severity and treatment of breast cancer, to suit their Kenyan audience. The specific questions were not detailed in the article. Further, two open-ended questions were added to the tool as follows: (1) “What are some beliefs, opinions and traditions that you have heard from others about breast cancer?” (2) “In your opinion, what are some of the early warning signs of breast cancer, the ways in which one may know first that s/he has this condition?” (p. 149) The questionnaire was translated into Kiswahili, Kenya’s national language, and this version subjected to content validation via three focus group discussions consisting of men and women without cancer aged 18 years and above, attending non-cancer outpatient clinics.

Wachira, et al.,<sup>53</sup> focused on validation of the BCAM in a Kenyan setting, based their work on 1061 women and an additional 48 women who participated in six cognitive focus group discussions. The authors opted to use BCAM in the absence of locally validated tools applicable in the Kenyan context. Of specific interest to this research team were two BCAM domains, breast awareness and perceived barriers to screening, which the Kenyan researchers associated with delays in timely interventions to enhance early breast cancer detection. Cognitive focus group interviews revealed that compound questions in the BCAM knowledge domain [for example, “do you think *discharge or bleeding* [italics added] from your nipple could be a sign of breast cancer?”] were confusing to participants, who recommended that

these questions be rephrased for clarity. The study observed variances in cultural interpretation of some items as well as nuances around translation of BCAM items into Kiswahili. For example, participants requested for clarification on the BCAM question “do you think that redness of your breast skin could be a sign of breast cancer”, noting that unless the top surface of the skin peels off, dark skin would not usually turn red. This resulted in rephrasing of the question to read “change in skin colour” in lieu of redness for contextual relevance.

## **Discussion**

Our scoping review provides a synthesis of research<sup>12</sup> on tools used to measure symptom awareness in SSA and determining if such tools have been validated in SSA settings. In this regard, our review identified gaps in SSA breast and cervical cancer tool validation literature by presenting the extent of research and how this research was conducted<sup>11</sup> in the period between 1997 and 2017. Scoping reviews are useful in various research aspects, including: examining the extent, range and nature of research activity; establishing the relevance of conducting a full systematic review; succinctly presenting and circulating research results, and; identifying gaps in literature.<sup>9</sup> In addressing how the research was conducted, the scoping review was limited to a narrative descriptive account of studies included and not a detailed analysis of the quality of these studies, which would be possible in a systematic review.<sup>9</sup>

Our findings demonstrate that several tools have been utilised to measure breast and cervical cancer in SSA contexts. Of the 41 SSA studies reviewed, 20 studies utilised tools that were not validated.<sup>15-32</sup> The other 21 studies identified tools used and offered information of varying detail regarding validation processes.<sup>33-53</sup> with only two studies demonstrating detailed and systematic tool validation processes.<sup>52,53</sup> Even so, these two studies are limited in that they show evidence of thorough validation focused on (a) breast cancer but not cervical cancer (b) only two of the BCAM domains namely, knowledge and/or perceptions of breast cancer and barriers to screening.

Twenty of the 41 studies reviewed were on breast cancer. Of these 20, 6 utilised tools that were not validated<sup>3,4,17,22,24,28</sup> while 14 used validated tools,<sup>33,35,36,38-41,45-49,52,53</sup> including the two that furnished detailed accounts of their validation process.<sup>52,53</sup> Eighteen of the 41 studies reviewed focused on cervical cancer themes. Of these 18, 11 studies utilised tools that were

not validated<sup>15,16,18-21,23,25,26,29,31</sup>, while 7 utilised validated tools.<sup>34,37,42-44,50,51</sup> Overall, more breast cancer studies (14) utilised validated tools than cervical cancer studies (7), most of which (11) utilised tools that were not validated. Of the 41 studies, 1 combined breast and cervical cancer themes<sup>32</sup> while 2 studies investigated cancer symptom awareness in general but also made mention of breast and cervical cancer symptom awareness among women in SSA.<sup>27,30</sup> All 3 studies used tools that were not validated.

Our results point to the dearth of comprehensively validated and culturally relevant tools to measure breast and cervical cancer symptom awareness in the SSA context, and the need for systematic efforts to develop and validate such tools. These findings are consistent with a study on understanding low cervical cancer screening in Uganda, which noted lack of validated tools in African settings.<sup>37</sup> Using consistent and reliable measures in cancer studies contributes to the quality of research results<sup>54</sup> which, in turn, will inform oncology practice in far as *‘standardised, valid measurement is essential for monitoring levels of cancer awareness, examining its risk factors and consequences, and evaluating interventions to promote it’*.<sup>55</sup>

Further, validated tools should be culturally relevant for their intended study populations.<sup>52,53,56</sup> The Cancer Awareness Measure (CAM) and the Awareness and Beliefs about Cancer (ABC) tool were developed in the UK to assess cancer awareness in the public; they include generic cancer awareness and cancer specific measures for breast cancer (BCAM) and cervical cancer (CCAM).<sup>57</sup> These tools could be of value in SSA; however, as they were developed in a very different sociocultural setting, they are likely to need adaptation for use in SSA. In our specific study context, validated tools which are culturally relevant in SSA settings will serve as standardised comparative measures to (a) assess breast and cervical cancer awareness, knowledge and beliefs, and (b) enable precise appraisal of breast and cervical cancer awareness interventions. Our findings have informed the development of an African Women Awareness of CANcer [AWACAN] tool to measure breast and cervical cancer awareness.

**Acknowledgement**

This scoping review is part of a project jointly funded by the South African Medical Research Council, MRC UK (via the Newton Fund), GlaxoSmithKline Africa Non-Communicable Disease Open Lab (via a supporting grant Project Number: 023), University of Cape Town and the Cancer Association of South Africa. The funders had no role in study design, data collection or decision to publish. Authors retained control of the final content of the publication.

**Competing interests**

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## Appendix 1

### List of Potential Search Terms from Existing Literature

1. Breast cancer	15. Literacy	29. Measures	42. Cancer control
2. Cervical cancer	16. Ignorance	30. Questions	43. Cancer
3. Symptom*	17. Culture	31. Validation	management
4. Signs	18. Stigma	32. Management	44. Qualitative
5. Symptom appraisal	19. Abscond	33. Disclosure	45. Quantitative
6. Symptom interpretation	20. Awareness	34. Report	46. Africa
7. Beliefs	21. Understanding	35. Risk*	47. Sub-Saharan
8. Attitudes	22. Construct*	36. Barriers	Africa OR Africa
9. Expressions	23. Expectations	37. Facilitators	South of the Sahara
10. Communication	24. Challenges	38. Screening	48. Low resource
11. Conceptualization	25. Opportunities	39. Delayed	countries
12. Lay perceptions	26. Tools	diagnosis	49. Rural
13. Behaviour	27. Scales	40. Timely diagnosis	50. Urban
14. Knowledge	28. Patterns	41. Treatment	

## Appendix 2

**Table 1: Symptom awareness tools identified; no validation details provided**

Study	Country	Focus	Design	Tool(s)	Validated
Mukama, T., et al (2017) <sup>15</sup>	Uganda	Knowledge and attitudes toward cervical cancer [CC] prevention	community-based cross-sectional survey	Questionnaire	No
Ndejjo, R, et al (2016) <sup>16</sup>	Uganda	Uptake of CC screening & associated factors	cross-sectional descriptive survey	Semi-structured questionnaire	No
Azubuike, S. O., & Unuoha, C. O. (2015) <sup>17</sup>	Nigeria	Breast cancer [BC] awareness, risk factors, signs & symptoms, preventive measures, attitudes, cure prevention, causes, practices, and associated factors	cross-sectional community survey	Semi-structured questionnaire developed from previous published studies [studies not cited]	No
Dreyer, et al. (2015) <sup>18</sup>	South Africa	School based HPV vaccination & CC knowledge	cross-sectional school-based study	Interviewer-administered structured questionnaire	No
Ali-Risasi et al (2014) <sup>18</sup>	DRC	Knowledge, attitude & practice about cancer of the uterine cervix	cross-sectional survey	Interviewer-administered questionnaire	No
Morema, E.N. et al (2014) <sup>20</sup>	Kenya	Determinants of CC screening services uptake	cross-sectional survey	Self-administered structured questionnaires	No
Ahmed, S.A. et al (2013) <sup>21</sup>	Nigeria	Knowledge, attitude & practice of CC screening	cross-sectional descriptive survey	Questionnaire (closed & open-ended questions)	No
Azubuike, S. & Okwuokei, S. (2013) <sup>22</sup>	Nigeria	Level of BC awareness, attitudes and practices towards early detection strategies	cross-sectional descriptive survey	Self-administered semi-structured questionnaire with 23 items developed from previous published studies [studies not cited]	No
Sudenga, S.L. et al (2013) <sup>23</sup>	Kenya	CC: Knowledge, attitudes, practices & perceived risk	cross-sectional survey	Interviewer-administered questionnaire	No
Iurhe, N.K. et al (2012) <sup>24</sup>	Nigeria	Knowledge & awareness of BC	cross-sectional survey	Self-administered questionnaire	No
Kahesa, C. et al (2012) <sup>25</sup>	Tanzania	Determinants of acceptance of CC screening	cross-sectional survey	Structured questionnaire	No
Were, E.N., Nyaberi, Z. & Buziba, N. (2011) <sup>26</sup>	Kenya	CC screening: Perceptions of risk & barriers	cross-sectional survey	Semi-structured questionnaire	No
Maree, J. E., & Wright, S. C. (2010) <sup>27</sup>	South Africa	Cancer understanding, awareness, and health seeking behaviours	exploratory, contextual, quantitative door-to-door survey	Structured questionnaire	No
Clegg-Lamptey, J., Dakubo, J., & Attobra, Y. N. (2009) <sup>3</sup>	Ghana	BC- late presentation and treatment absconding	cross-sectional survey	Interviewer-administered questionnaire	No
Osime, O.C. et al. (2008) <sup>28</sup>	Nigeria	BC knowledge, attitudes and practice	cross-sectional survey	structured self-administered questionnaire	No
Tebeu, P.M. et al (2008) <sup>29</sup>	Cameroon	CC: attitude & Knowledge	hospital-based survey	Questionnaire	No
Ukwenya, A. Y. et al. (2008) <sup>4</sup>	Nigeria	Delayed treatment of symptomatic BC	cross-sectional study	Structured open-ended questionnaire	No
Kazaura, M.R. et al (2007) <sup>30</sup>	Tanzania	Health seeking behaviour among CA patients	hospital-based survey	Structured and semi-structured interviews	No
Kidanto, H.L., Kilewo, C.D., & Moshiri, C. (2002) <sup>31</sup>	Tanzania	CC: Knowledge and attitudes of female patients	comparative cross-sectional survey	Structured questionnaire	No
Pillay, A. L. (2002) <sup>32</sup>	South Africa	BC & CC Awareness	community based survey	Interviewer-administered structured questionnaire (fixed format) – sample questions included; informed by oncology literature [not specified]	No

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